Atlantic Research Center

at Highlands Center at Cape Cod National Seashore

National Park Service
U.S. Department of Interior

Highlands Center
At Cape Cod National
Seashore

The mission of the Atlantic Research Center is to promote research and information exchange on the physical and biological systems within or affecting Cape Cod National Seashore (CCNS).

The **Atlantic Research Center (ARC)**, managed by Cape Cod National Seashore, is part of a network of National Park Service Research Learning Centers throughout the United States. These RLCs are charged with enhancing management of our national parks by expanding scientific research in the parks, and facilitating science communication.

Research at the ARC

ARC research partners are typically from academia, state and federal agencies, and non-profit conservation science institutions. Individuals working at the **ARC** have included senior principal investigators, post-doctoral fellows, and graduate students. Each field season, the **ARC** also hosts a number of undergraduate interns.

The questions pursued by **ARC** research partners are wide-ranging and span a number of physical and biological disciplines. CCNS Scientists manage the **ARC** facilities. Many projects are linked to ongoing monitoring carried out by CCNS's Long-Term Ecosystem Monitoring Program. LTEM projects provide baseline change data and opportunities for collaboration with LTEM scientists. The primary LTEM projects are:

- estuarine nutrient enrichment
- pond-breeding amphibians
- salt marsh vegetation
- vegetation cover-type change
- salt marsh sediment elevation
- dune grasslands and coastal heathlands
- estuarine nekton
- coastal forest vegetation
- geomorphic coastal change
- meteorologic and atmospheric monitoring, and
- kettle pond water quality
- ground- and surface-water hydrology
- pond and vernal wetland vegetation

Cross-cutting research themes being pursued by CCNS scientists and **ARC** research partners include:

- local effects of global/hemispheric processes (eg. sea level rise, atmospheric deposition, global warming)
- nutrient dynamics in aquatic systems and the relative influences of atmospheric, groundwater, and oceanic inputs
- responses of physical, chemical, and biotic parameters to habitat restoration, primarily restoration of tidally impaired marshes

Left: A Barnstable County AmeriCorps Cape Cod (ACC) Member tests the nutrient concentration in estuarine waters.

Right: An ACC Member measures surface water flow.

The **ARC** offers a variety of services and support to facilitate research including:

- laboratory and desk space
- field equipment
- analytical services
- housing
- GIS and ecosystem monitoring data
- collaboration with CCNS scientists
- the Charles S. Davidson Memorial Library
- opportunities for science communication to students and the general public

ARC laboratory and field support facilities are co-located with NPS Scientist at CCNS's North Atlantic Coastal Laboratory at the Highlands Center at Cape Cod National Seashore in Truro, Massachusetts.

Analytical Services

The **ARC's** analytical services are frequently highlighted as an important component of **ARC** research partnerships. In addition to the opportunity for one-on-one collaboration with the technician performing the analyses and rapid data feedback, researchers using **ARC** analytical services can reduce costs by paying only for consumable materials, avoiding shipping to an off-site facility, and performing the sample prep or analyses themselves. Currently, the **ARC** offers the following analyses (method citations and detection limits available on request):

- dissolved nutrients:
  - ammonium in water
  - ammonium in soil (KCl extraction)
  - orthophosphate in water (low phosphate method)
  - nitrate/nitrite in water
  - nitrate in soil (KCl extraction)
- total phosphorus in plant tissue
- total nitrogen in water (persulfate oxidation)
- total phosphorus in water (persulfate oxidation)
- anions (chloride, sulfate)
- sulfide in salt marsh porewater

Research partners measuring shellfish response to estuarine restoration.

CCNS Scientist Measuring light penetration in kettle ponds.

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